REMARKS

I. CLAIM CHANGES

Three new sets of method claims, namely method-of-making-glass bottle claims 11 to 15; method-of-making-glass bottle claims 16 to 19; and claims 20 to 25 for a method of avoiding contamination of the inner surface of a hollow glass tube by alkali compounds during thermal processing, have been added and the original claims 1 to 10 have been canceled.

Independent claims 11 and 16 both claim a method of making small glass containers. These new method claims 11 and 16 are fully supported by the disclosure on page 4, lines 14 to 17, of the originally filed specification, at which point the specification states that a glass container is made by a method including thermal processing of a hollow glass body. Furthermore the disclosures on page 4, lines 18 to 21, and lines 7 to 8, provide the basis for stating that the method reduces contamination due to alkali release from an inner surface of the container during heating or thermal processing.

The first two steps a) and b) of the method of claims 11 and 16 are new steps, which were <u>not</u> present in the canceled claims 1 to 10. Both of steps a) and b) are fully supported by the disclosures in the "Detailed Description of the Invention" on page 8 and following of the applicants' specification and by figs. 1 and 2. In these preferred embodiments the hollow glass body is a glass tube 2

and it is clamped in a bottle machine 1 in a vertical position (see page 8, lines 6 to 7, of applicants' specification). Step b), the step of heating the lower end, is supported by the disclosure on page 8, lines 8 to 11, since the jet flame 3 must heat the "upper bottom" to open it to form the bottle mouth (which is at the lower end of the glass tube after the cut off tube portion is discarded).

The steps c) of independent claims 11 and 16 are the critical steps that describe the actions that reduce the release of alkali contaminants on the inner surface of the glass tube. The steps c) of claims 11 and 16 are different, but both steps produce an overpressure in the interior of the glass tube (see page 5, line 7, and lines 13 to 15, of the applicants' specification) that suppresses generation of alkali contamination on the inner surface of the glass tube. Furthermore in the method of claim 11, step c, and fig. 2 the extent of the overpressure is controllable so that an excessive pressure that would otherwise damage the glass tube is not produced by controlling the extent of the partial opening (page 6, lines 7 to 13, and page 9, lines 8 to 13, of the applicants' originally filed specification). In the method of claim 16, step c, the tube is not constricted or partially closed at its upper end, but instead a gas is supplied or blown through the open upper end in a direction that is opposite to the heated air rising from the flame 3 (see page 3, lines 21 to 23, of applicants' specification and fig. 1).

The step c) of independent claim 11 is also supported by the disclosure on page 6, lines 1 to 6, of applicants' specification. The upper end of the tube can be partially closed by constricting that end (page 6, line 16) or a stopper with a hole in it can be inserted in the open upper end as claimed in dependent claim 12.

The features of the latter embodiment are supported by the disclosure on page 9, lines 4 to 8, of the applicants' specification. The "puncturing" mentioned at that point is of course the "opening of the upper bottom" disclosed on page 8, line 10, of the specification, which occurs by applying the jet flame 3, which produces the heating of step b) of claim 11.

Step c) of claim 16 is fully supported by the disclosure on page 5, lines 16 to 23.

The subject matter of claims 13, 14, and 15 is the same as claims 17, 18, and 19 respectively. This subject matter is fully supported by the disclosure on page 8, lines 8 to 11. The mouth of the bottle is formed at the lower end (upper bottom) of the glass tube 2 held vertically (claims 15 and 19). However the glass tube must first be cut through to the right length and then a lower portion with a "lower bottom" is discarded and the remaining portion of the tube held upright in the bottle machine with the closed "upper bottom", which must be opened to form the bottle mouth. Then of course the bottom of the bottle must be formed at the end opposite from the "upper bottom" or lower end of the glass tube, i.e. at the upper open end. Note that a single glass tube can be used to form more than one bottle (page 8, line 15).

Claims 20 to 25 claim a method of avoiding contamination of an inner surface of a hollow glass body by alkali compounds during thermal processing when the hollow glass body is composed of an alkali-metal-containing glass.

Steps a, b of independent claim 20 are the same as steps a, b of independent claim 11 or 16 respectively and are supported by the disclosure as

outlined above. The embodiment of fig. 1 is claimed in dependent claim 21. The embodiment of figure 2 is claimed in dependent claims 22 and 23. Dependent claims 24 and 25 include the features of dependent claims 13 and 14.

II. Anticipation Rejection based on Creevy,et al

Claims 1 and 6 to 8 were rejected as anticipated under 35 U.S.C. 102 (b) by Creevy, et al, U.S. Patent 3,375,948.

This anticipation rejection is applied to the claims that claim subject matter of the embodiment of fig. 2 in which there is a constriction or partial closing of the upper end of the vertically oriented glass tube. This embodiment is claimed in claims 11 to 15 and dependent claims 22 and 23.

There are several differences between the disclosures of Creevy, et al, and the methods claimed in the new claim 11 and the dependent claims 22 and 23.

First Creevy, et al, do not disclose the limitation of heating the lower end of the glass tube. The upper end of the glass ampoule of Creevy, et al, is heated with a narrow jet flame to pierce the upper end, which is otherwise closed, according to claim 3 of this reference. The pressure in the glass ampoule of US '948 is raised by heating, but not necessarily of the lower end of the glass ampoule, according to claim 1 of Creevy, et al.

Also the glass tube of applicants' claim 11 steps a to c is arguably not a glass ampoule but a pre-cursor of a glass ampoule in some cases.

Next Creevy, et al, do not disclose that the glass tube has an open upper end. The glass body of Creevy, et al, has a "sealed top" according to claim 1, line 4, which is pierced only later after raising the internal pressure to provide a small opening. In the case of applicants' method claimed method (claim 11) it is essential to provide a partial closing of the open upper end (step c) so that during the heating step b) the internal pressure will increase.

Thus the upper opening in the glass tube is present in applicants' claimed method of claim 11 during the raising of the internal pressure while the glass tube is heated, but is dimensioned so that a certain overpressure results. In the case of Creevy, et al, the opening is not present until after the internal pressure is raised.

Creevy, et al, does not anticipate claim 11 or claims 22 and 23 because Creevy, et al, does not disclose the foregoing features of the new claims 11 and 22 and 23.

Furthermore step c) and the last paragraph of claim 11 claims embodiments in which the extent of the closing of the opening at the top of the tube is only such that the overpressure produced does not damage the glass tube during thermal processing, but is large enough to reduce the alkali contamination of the inner surface of the glass tube. The same is true of the subject matter of dependent claims 22 and 23.

This latter feature of these claims is essentially a pressure range for the overpressure that is defined in a functional manner.

It is well established that each and every limitation of a claimed invention

must be disclosed in a single prior art reference in order to be able to reject the claimed invention under 35 U.S.C. 102 (b) based on the disclosures in the single prior art reference. See M.P.E.P. 2131 and also the opinion in ***In re Bond***, 15 U.S.P.Q. 2nd 1566 (Fed. Cir. 1990).

In summary, Creevy, et al, do not disclose or suggest the method claimed in the new claim 11 or in claims 22 and 23. Creevy, et al, disclose a method of thermally processing or working an ampoule with an initially sealed top, whereas applicants claim a method of thermally processing or working a glass tube with an initially open upper end, which is clamped in a vertical orientation. Instead of heating in general and especially the sealed top to form a small opening as in Creevy, et al, in applicants' method the lower end of the glass tube is heated so that air or gas will rise in the tube creating an overpressure due to the constriction at the tube of the glass tube. The functionally claimed pressure range of step c) of claim 11 is neither disclosed nor suggested by Creevy, et al.

For the foregoing reasons new claims 11 to 15 and 22 and 23 should not be rejected as anticipated under 35 U.S.C. 102 (b) by Creevy, et al.

III. Anticipation or Obviousness of Claims based Schul, US '022

Claims 1 to 3 were rejected as anticipated under 35 U.S.C. 102 (b) by, or alternatively obvious under 35 U.S.C. 103 (a) over, Schul, U.S. Patent 4,010,022.

Schul discloses horizontally feeding a rotating hollow silica tube (column 2, lines 50 to 55) through an electric furnace and subsequently shaping the

rotating silica tube with graphite plates 12, 13. However to prevent the softened silica tube from collapsing under the clamping, air is forced in the end of the silica tube upstream of the electric furnace. Because of the inert gas forced through the softened tube (column 2, lines 64 to 68; column 3, lines 6 to 13), its outer dimensions are kept within strict tolerances.

In fact, Schul does not disclose a method of making small glass bottles and thus is not relevant for new claims 11 to 19. Schul only discloses a method of thermally processing a fused silica tube in a continuous process in which the silica tube is continuously fed horizontally, softened by heating in a furnace, compressed by graphite plates at an outlet of the furnace, and pressurized by a flow of inert gas through its interior, so that the resulting silica tube has an extremely precise and accurate predetermined outer diameter (column 1, lines 52 to 65). Schul never discloses or suggests making glass bottles of any kind. Also Schul does not disclose the additional steps that are necessary to make the finished glass bottle, such as forming a bottle mouth by opening a bottom of the tube as claimed in dependent claims 14, 15 and 18, 19. Furthermore Schul does not disclose cutting the glass tube to length and forming a bottom as claimed in claims 13 and 17. These latter steps in the applicants' dependent claims are not disclosed or suggested by Schul, who is only concerned with making silica tubes of very accurate dimension.

Furthermore thermal processing of silica tubes does not suffer from the problem that the applicants' are trying to solve, namely the reduction of alkali contaminants from the inner surface of the glass tube that is used to form the

bottle. Silica is another name for SiO_2 and does not contain alkali metal cations.

In contrast, applicants' claimed method is a method of making small glass bottles in a batch process using in a bottle machine in which at least one glass tube is clamped in a vertical position (step a of independent claims 11, 16, and 20). It is essential to clamp the glass tube in a vertical position so that the subsequent processing steps, such as those recited in the dependent claims, can be performed on each of the at least one glass tubes clamped in the vertical position. Also Schul does not disclose heating a lower end of the glass tube (step b) because the silica tube of Schul is heated centrally, not on an end of the tube, as it continuously passes through a furnace (see the figure). Furthermore a lower end is not heated because there is no lower end; the silica tube of Schul is horizontally oriented.

It is well established that each and every limitation of a claimed invention must be disclosed in a single prior art reference in order to be able to reject the claimed invention under 35 U.S.C. 102 (b) based on the disclosures in the single prior art reference. See M.P.E.P. 2131 and also the opinion in ***In re Bond***, 15 U.S.P.Q. 2nd 1566 (Fed. Cir. 1990).

Also it is well established that the desirability of the modifications of the disclosure in a prior art reference that are necessary to arrive at a claimed invention must be suggested in the prior art to provide the basis for a valid obviousness rejection under 35 U.S.C. 103 (a). See M.P.E.P. 2141 and following and also more recently *Alza Corporation v. Mylan Laboratories, Inc.*, Fed. Cir., No. 06-1019, 9/6/06.

The features of steps a) and b) of independent claims 11, 16, and 20 are not disclosed or suggested by Schul. Also Schul does not disclose or suggest making small bottles. Especially Schul does not disclose a batch process in which individual glass tubes are clamped in a vertical orientation and the lower ends of the glass tubes are heated.

Furthermore it is well established that a prior art reference that leads one skilled in the art away from the claimed invention should not be used to reject the claimed invention under 35 U.S.C. 103 (a). See M.P.E.P. 2145. X. and also the Federal Circuit Court of Appeals has said:

> "In determining whether such a suggestion [of obviousness] can fairly be gleaned from the prior art...It is indeed pertinent that these references teach against the present invention. Evidence that supports, rather than negates, patentability must be fairly considered." ***In re Dow Chemical Co.,*** 837 F.2nd 469,473, 5 U.S.P.Q.2d 1529, 1532 (Fed.Cir. 1988)

Applicants are claiming a method of thermally processing a glass tube that is made from an alkali-metal-containing glass, whereas Schul discloses a method of processing a pure silica tube (which necessarily does not contain an alkali metal). The title of the invention, column 1, line 65, to column 2, line 24, of Schul and the claims of Schul disclose only a process or method or apparatus for making silica tubes with extremely small tolerances for the outer diameters. There is no suggestion that their method would work or produce satisfactory results of glass tubes made with a glass composition including alkali metal cations, which would have different processing temperatures (silica is very high melting) and different chemical reactivity.

For the foregoing reasons new claims 11 to 25 should not be rejected as anticipated under 35 U.S.C. 102 (b) by Schul, US '022, or obvious under 35 U.S.C. 103 (a) over Schul, US '022.

IV. Anticipation or Obviousness of Claims based Mueller, et al

Claims 1 to 5 and 10 were rejected as anticipated under 35 U.S.C. 102 (b) by, or alternatively obvious under 35 U.S.C. 103 (a) over, Mueller, et al. U.S. Patent 6,536,239.

Mueller, et al, do disclose a method of shaping glass tubes in a semi-automatic or automatic continuous process. The method comprises shaping an end region of a tube to enable a second tube to be inserted snuggly in the end. In the method the larger tube is heated with a torch on one end and air flows through the tube as shown in figures 5 and 6 of Mueller, et al. When the end of the larger tube is sufficiently softened sidepieces and an end cap engage with the end to shape it for insertion of the smaller tube (see abstract, figs. 3A and 3B). An overpressure is provided to feed air through the tube (column 9, lines 33 to 45).

Mueller, et al, like Schul, do not disclose a method of making small glass bottles and thus is not relevant for new claims 11 to 19. Mueller, et al, only disclose a method of thermally processing two glass tubes of different diameter for the purpose of properly interfacing and mating the glass tubes, as shown in fig. 6 of Mueller, et al. Mueller, et al, never disclose or suggest making glass

bottles of any kind. Also Mueller, et al, do not disclose the additional steps in the dependent claims that are necessary to make the finished glass bottle, such as forming a bottle mouth by opening a bottom of the tube as claimed in dependent claims 14, 15 and 18, 19. In addition, Mueller, et al, do not disclose thermally cutting the glass tube to length and forming a bottom as claimed in dependent claims 13 and 17.

In contrast, applicants' claimed method is a method of making small glass bottles in a batch process using in a bottle machine in which at least one glass tube is clamped in a vertical position (step a of independent claims 11, 16, and 20). It is essential to clamp the glass tube in a vertical position so that the subsequent processing steps including the production of the overpressure can be performed on each of the at least one glass tubes clamped in the vertical position. Also Mueller, et al, do not disclose heating a lower end of the glass tube because a lower end is not heated, since there is no lower end; the glass tube or tubes of Mueller, et al, is or are horizontally oriented. Mueller, et al, heat a lateral end of the glass tube.

It is well established that each and every limitation of a claimed invention must be disclosed in a single prior art reference in order to be able to reject the claimed invention under 35 U.S.C. 102 (b) based on the disclosures in the single prior art reference. See M.P.E.P. 2131 and also the opinion in ***In re Bond***, 15 U.S.P.Q. 2nd 1566 (Fed. Cir. 1990).

Also it is well established that the modifications of the disclosure in a prior art reference that are necessary to arrive at a claimed invention must be

suggested in the prior art to provide the basis for a valid obviousness rejection under 35 U.S.C. 103 (a). See M.P.E.P. 2141 and following and also more recently *Alza Corporation v. Mylan Laboratories, Inc.*, Fed. Cir., No. 06-1019, 9/6/06.

The features of steps a) and b) of independent claims 11, 16, and 20 are not disclosed or suggested by Mueller, et al. Also Mueller, et al, do not disclose or suggest making small bottles. Especially Mueller, et al, do not disclose a batch process in which individual glass tubes are clamped in a vertical orientation and the lower ends of the glass tubes are heated.

For the foregoing reasons new claims 11 to 25 should not be rejected as anticipated under 35 U.S.C. 102 (b) by Mueller, et al, U.S. Patent 6,536,239 or obvious under 35 U.S.C. 103 (a) over Mueller, et al, U.S. Patent 6,536,239.

V. Obviousness Rejection based on Mueller, et al, and Maiden

Claims 6 and 9 were rejected as obvious under 35 U.S.C. 103 (a) over Mueller, et al, in view of Maiden.

This obviousness rejection is applied to claims that claim subject matter of the embodiment of fig. 2 in which there is a constriction or partial closing of the upper end of the vertically oriented glass tube. This embodiment is claimed in claims 11 to 15 and dependent claims 22 and 23.

Column 6, lines 37 to 39, of Mueller, et al, do disclose that there is a constriction at one end of the larger tube. However the disclosure at this point in

Mueller, et al, teaches that the constriction is formed so that the extreme end of the larger tube fits the diameter of the smaller tube to be mated with it (column 6, line 47; column 4, lines 9 to 13; column 4, lines 20 to 27). In contrast, applicants' claims 11 and 20 claim "a partial closing so that an overpressure is produced" (step c) "so that the contamination of the interior surfaces ... is reduced" (last two lines of claim 11 or 20) but so that it is **not an excessive overpressure** that would damage the glass tube.

In the case of applicants' claims 11 and 20 the condition for setting the magnitude of the overpressure is **entirely different and not suggested** by the condition for determining the size of the constriction at the end of the horizontally oriented larger tube in Mueller, et al. The overpressure required to be effective to reduce the alkali contaminants on the inner surface is likely to be unrelated to any overpressure produced by the constriction of Mueller, et al, because the size of the tapering or constriction of Mueller, et al, depends on the dimensions of the two glass tubes to be interfaced and mated, not on the chemical composition of the surface of the resulting glass tubes.

Thus Mueller, et al, simply do <u>not</u> **disclose or suggest** the features of claim 11, step c and the last paragraph, or the features of claims 22 and 23.

Regarding Maiden stoppers with through-going openings are used in many different types of chemical apparatus and are well-known components in chemical laboratories. Maiden discloses nothing more than this fact, which is well known to those skilled in the chemical arts.

Maiden does disclose a stopper 74 with a through-going opening, but it is

not arranged for the purpose of providing a partial closing of the glass tube at one end while a gas flows into the glass tube through an opening at the opposite end of the glass tube and out through the through-going opening of the stopper. One skilled in the art would understand that e.g. an air flow through the glass tube would occur from the lower end to the open upper end when the lower end is heated, as claimed in step b) of all the independent claim 11 because the heated air would rise in the vertically oriented glass tube. Instead Maiden teaches a stopper with a through-going opening through which gas is supplied to the apparatus. This is the opposite from the applicants' inventive method, in which the heated air passes out of the apparatus through the opening in the stopper in the case of claim 11 and claims 22 and 23.

Thus Maiden teaches the opposite from the claimed invention and thus should not be combined with Mueller, et al, because a reference that teaches the opposite from the claimed invention, should not be combined with any other reference under 35 U.S.C. 103 (a) to reject the claimed invention as obvious. M.P.E.P. 2145 X. and see above.

Furthermore if Maiden suggests anything, it suggests providing the stopper at the lower end of the glass tube instead of at the open upper end.

In addition, Maiden does not provide any hint or suggestion of the criteria for determining the extent of the overpressure in the glass tube or the extent of the partial closing of the upper end as claimed in applicants' independent claim 11 or the dependent claim 22, which is lacking in Mueller, et al. Thus Maiden does not provide the necessary hint or suggestion of the modifications of the

disclosures in Mueller, et al, which are necessary to arrive at the claimed invention.

For the foregoing reasons it is respectfully submitted that claims 11 to 15 and claims 22 and 23 should not be rejected under 35 U.S.C. 103 (a) over Mueller, et al, in view of Maiden.

VI. Information Disclosure Statement

The prior art reference "Schott-Glasslexicon", which was described in the background section of applicants' specification on page 3, was not initialed on the Information Disclosure Statement returned with the Office Action. This appears to be an inadvertent error, because the listing of this prior art reference on the Information Disclosure Statement was not crossed out.

Return of another copy of this Information Disclosure Statement (form PTO-A820) with the listing of the prior art reference "Schott-Glasslexicon" properly initialled by the Examiner is respectfully requested.

The content of this prior art reference is described in applicants' specification on page 3. Furthermore prior art references in a foreign language should be considered to the extent possible on the basis of chemical formulae, figures, and tables, according to U.S. Patent Office Rules 37 C.F.R. 1.98(a) (3) (i) and (ii) and M.P.E.P. 609, if an English translation has not been provided.

Should the Examiner require or consider it advisable that the specification, claims and/or drawing be further amended or corrected in formal respects to put this case in condition for final allowance, then it is requested that such amendments or corrections be carried out by Examiner's Amendment and the case passed to issue. Alternatively, should the Examiner feel that a personal discussion might be helpful in advancing the case to allowance, he or she is invited to telephone the undersigned at 1-631-549 4700.

In view of the foregoing, favorable allowance is respectfully solicited.

Respectfully submitted,

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